REMARKS

Claim Objections

Claims 1, 2, 7 and 8 were objected to because of informalities.

Accordingly, the claims have been amended. Thus, the objection has been overcome.

Rejections under 35 USC §103(a)

Claims 1-5 were rejected under 35 USC §103(a) as being obvious over Yoshimura et al. (Quasicrystal Application on Catalyst).

The Examiner alleged as follows:

> Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious different between the claimed product and the prior art product (In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 21 13).
>
> With the significant amount of product by process in the claim limitations of instant claim 1, it is noted by examiner that the product of claim one is a catalyst comprising Al alloy particles having an oxide surface layer containing fine copper oxide particles where the surface layer is composed of aluminum oxide, copper oxide, and a TM oxide.

(Office Action, page 3, lines 10-20). However, the Examiner's alleged prima facie showing is rebutted based on the description in the present specification.

Yoshimura et al. describes as follows:

> A nominal alloy of stable quasicrystal $Al_{63}Cu_{25}TM_{12}$ with TM of Fe, Ru, 0s and other Al-Cu-Fe alloys were prepared from pure elements with purities of 99.9 wt.% Al, 99.9 wt.% Cu, 99.9 wt.% Fe, 99.9 wt.% Ru, 99.9 wt.% Os, in an arc furnace in argon atmosphere. The alloys were wrapped in Mo film and then encapsulated in an evacuated quartz tube with an

> argon atmosphere, and subsequently annealed at 1073 K for 6 h. The annealed alloys were crushed to particle sizes of interest in a ballmill. The sample powders were leached in 20 wt.% NaOH aqueous solution, kept in the solution for 12 h, and then they were filtered out and thoroughly washed with distilled water until no was detected in the filtrate. The steam reforming of methanol experiments were carried out in a conventional flow reactor at 100 kPa. **The samples were reduced in a hydrogen atmosphere at 523 K before reaction**. Inlet partial pressure of methanol, water and were 35.5, 52.7, 13.2 kPa, respectively. Here nitrogen was used as dilutent. Evaluation of catalytic activity was based on gas chromatographic analysis of product hydrogen gas. Thus, the activity is quoted in terms of the production of hydrogen gas. Surface area determination of particles was made by the BET method.' The phase formation before and after leaching of the alloy was identified by X-ray diffraction using a Cu Ka source.

(Yoshimura et al., p. 452, "2. Experimental"). Thus, according to Yoshimura et al., the sample powders are reduced after the leaching before the reaction. Therefore, the fine Cu particles contained in the oxide surface layer are of Cu metal rather than converted into copper oxide.

In contrast, according to the present invention, a heat treatment of the leached Al alloy particles is performed in an oxidizing atmosphere, and some or all of the fine Cu particles contained in the oxide surface layer are converted into the fine copper oxide particles.

Due to the differences, there are significant differences in the effect as a catalyst. For example, Figs. 2 and 3 show the rate of hydrogen production against reaction temperature in steam reforming of methanol using the catalysts. The charts do not show the data at temperatures of 360°C or less. Despite the general tendency that the rate of hydrogen production increases with the rise of temperature, Figs 2 and 3 show the rates of hydrogen production as low as 150 ml/g·min or less at about 510°C. In contrast, Figs. 5-8 show the rates of hydrogen production as high as 400 ml/g·min or more at about 360°C which is obtained using the catalyst of the present

invention.

Thus, the catalyst according to the present invention is clearly distinguished from the catalyst disclosed in Yoshimura et al. by the chemical composition as well as by the function as a catalyst.

For at least these reasons, claim 1 patentably distinguishes over Yoshimura et al. Claims 2-5, depending from claim 1, also patentably distinguish over Yoshimura et al. for at least the same reasons.

Claims 6 was rejected under 35 USC §103(a) as being obvious over Yoshimura et al. (Quasicrystal Application on Catalyst) as applied to claim 1 above, and further in view of Yamasaki et al. (Oxidation Behavior of Quasicrystalline $Al_{63}Cu_{25}Fe_{12}$).

Claim 6 has been cancelled making the rejection moot.

Claims 7, 8, and 11 were rejected under 35 USC §103(a) as being obvious over Yoshimura et al. (Quasicrystal Application on Catalyst).

As is clear from the discussion regarding claims 1-5, Yoshimura et al. does not teach or suggest "performing heat treatment of the leached Al alloy particles in an oxidizing atmosphere so that some or all of the fine Cu particles are converted into fine copper oxide particles, whereby the catalyst used for steam reforming of methanol is manufactured so as to have Al alloy particles provided with oxide surface layers containing the fine copper oxide particles," as recited in claim 7.

For at least these reasons, claim 7 patentably distinguishes over Yoshimura et al. Claims 8 and 11, depending from claim 7, also patentably distinguish over Yoshimura et al. for at least the same reasons.

Claims 9 was rejected under 35 USC §103(a) as being obvious over Yoshimura et al. (Quasicrystal Application on Catalyst) as applied to claim 7 above, and further in view of Kazuhito et al. (JP 03-238049).

Kazuhito et al. was cited for allegedly disclosing a methanol reforming catalyst consisting Cu, Zn and Al is leached in an alkali solution of 30-60°. However, such disclosure of Kazuhito et al. does not remedy the deficiencies of Yoshimura et al. discussed above.

For at least these reasons, claim 9 patentably distinguishes over Yoshimura et al. and Kazuhito et al.

Claims 10 is rejected under 35 USC §103(a) as being obvious over Yoshimura et al. (Quasicrystal Application on Catalyst) as applied to claim 7 above, and further in view of Morinaga et al. (JP 40-2233501).

Morinaga et al. was cited for allegedly disclosing leaching the alloy in an aqueous alkaline solution of 1-40% NaOH. However, such disclosure of Morinaga et al. does not remedy the deficiencies of Yoshimura et al. discussed above.

For at least these reasons, claim 9 patentably distinguishes over Yoshimura et al. and Morinaga et al.

Claims 12 was rejected under 35 USC §103(a) as being obvious over Yoshimura et al. (Quasicrystal Application on Catalyst) as applied to claim 7 above, and further in view of Yamasaki et al. (Oxidation Behavior of Quasicrystalline $Al_{63}Cu_{25}Fe_{12}$).

Claim 6 has been cancelled making the rejection moot.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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